

**II B.Tech I Semester Supplementary Examinations, November 2006**  
**LINEAR & DIGITAL IC APPLICATIONS**  
 ( Common to Computer Science & Engineering, Information Technology  
 and Computer Science & Systems Engineering)

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions**  
**All Questions carry equal marks**

\*\*\*\*\*

1. (a) List out the ideal characteristics of an OP-AMP. [3]  
 (b) With neat block diagram explain the function of various building blocks of an OP-AMP. [10]  
 (c) Draw the equivalent circuit of an OP-AMP. [3]
2. (a) Discuss the operation of a log amplifier and derive the expression for output voltage. [9]  
 (b) Design a current to voltage converter using OP-AMP and explain how it can be used to measure the output of a photocell. [7]
3. (a) What feedback is preferred for oscillators and why? What is the effect of negative feedback? [8]  
 (b) Design an OP-AMP based relaxation oscillator and derive the frequency of oscillation. [8]
4. (a) Draw the circuit of Schmitt trigger using 555 timer and explain its operation. [8]  
 (b) How is an Astable multivibrator using 555 timer connected in to a pulse position modulator? [8]
5. (a) Give the functional block diagram of NE 565 PLL (DIP) and for the given component values.  $C_1 = 390PF$ ,  $C_2 = 680PF$  and  $R_1 = 10k$ ,  $V_{cc} = \pm 6V$  Find [8]
  - i. The free running frequency
  - ii. The lock range and capture range

Where  $C_1$  is the capacitor connected between pin number 9 and  $-V_{CC}$ ,  $C_2$  is the capacitor connected between  $+V_{CC}$  and output pin 7, and  $R_1$  is connected between pin number 8 and  $+V_{CC}$
- (b) Give the functional block diagram of VCO NE566 and explain its working and necessary expression for free running or center frequency. [8]
6. (a) Explain the term "Frequency Sealing" with suitable example. [6]  
 (b) Design a wide band-pass filter with  $f_L=200Hz$ .  $f_H=1KHz$  and a pass-band gain=4. Draw the frequency response and calculate 'Q' factor for the filter. [10]

7. (a) What are the desirable features of CMOS gates? [5]
- (b) Sketch the circuit of CMOS NAND gate and verify that it satisfies the Boolean NAND equation. [6]
- (c) Define the following terms : [5]
- i. Fan-in
  - ii. Fan-out
  - iii. Standard load
  - iv. Current sink
  - v. Current source
8. (a) List out various types of D/A converter and A/D converters and compare their merits and demerits. [8]
- (b) Give the schematic circuit of successive approximations A/D converter and explain its operations. [8]

★ ★ ★ ★ ★